# United States Patent [19]

## San Soucie et al.

[11] Patent Number: 5,369,778

[45] Date of Patent: Nov. 29, 1994

[54] **DATA PROCESSOR THAT CUSTOMIZES PROGRAM BEHAVIOR BY USING A RESOURCE RETRIEVAL CAPABILITY**

[75] Inventors: Marc San Soucie, Tyngsboro; Carolyn E. Surprenant, Dracut; Thomas Fitzgerald, Lowell; Susan Walker, Arlington, all of Mass.

[73] Assignee: Wang Laboratories, Inc., Lowell, Mass.

[21] Appl. No.: 127,981

[22] Filed: Sep. 27, 1993

### Related U.S. Application Data

[63] Continuation of Ser. No. 915,775, Jul. 16, 1992, abandoned, which is a continuation of Ser. No. 88,176, Aug. 21, 1987, abandoned.

[51] Int. Cl.$^5$ .......................................... G06F 15/403
[52] U.S. Cl. ................................. 395/800; 364/419.19; 364/942.51; 364/942.3; 364/DIG 2; 395/500; 395/600
[58] Field of Search ................... 364/DIG. 1, DIG. 2, 364/419; 395/200, 275, 500, 600, 700, 800

[56] References Cited

#### U.S. PATENT DOCUMENTS

| | | | |
|---|---|---|---|
| 4,183,083 | 1/1980 | Chatfield | 364/200 |
| 4,266,271 | 5/1981 | Chamoff et al. | 364/200 |
| 4,394,727 | 7/1983 | Hoffman et al. | 364/200 |
| 4,394,730 | 7/1983 | Suzuki et al. | 364/200 |
| 4,481,577 | 11/1984 | Forson | 364/200 |
| 4,566,078 | 1/1986 | Crabtree | 364/419 |
| 4,584,644 | 4/1986 | Larner | 364/200 |
| 4,595,980 | 6/1986 | Innes | 364/419 |
| 4,604,686 | 8/1986 | Reiter et al. | 364/200 |
| 4,648,046 | 3/1987 | Copenhaver et al. | 395/131 |
| 4,688,195 | 8/1987 | Thompson et al. | 395/12 |
| 4,719,574 | 1/1988 | Duback et al. | 364/468 |
| 4,742,482 | 5/1988 | Inskeep et al. | 364/900 |
| 4,771,380 | 9/1988 | Kris | 364/200 |
| 4,805,134 | 2/1989 | Calo et al. | 395/600 |
| 4,870,610 | 9/1989 | Belfer | 364/900 |
| 4,933,835 | 6/1990 | Sachs et al. | 364/200 |
| 4,974,191 | 11/1990 | Amirghodsi et al. | 395/275 |

### OTHER PUBLICATIONS

Inside Mcintosh vol. I, Apple Computer, pp. I-101 to I-134.

BYTE, "The Lisa Computer System" vol. 8, No. 2, Feb. 1983; pp. 33-50.

BYTE, "The Apple Macintosh Computer" vol. 9, No. 2, Feb. 1984; pp. 30-54.

Inside Macintosh, volumes I, II, and III, "The Resource Manager", 1985, pp. I-103-I-113.

[57] **ABSTRACT**

A data processing system based on an extensible set of typed data objects and a corresponding set of "object managers," each of which is a program for operating with the data stored in a corresponding type of object. The object managers in general support at least a standard set of operations. Any program can effect performance of these standard operations on objects of any type by making a particular request; in response to such a request, an object manager that is suitable for performing the requested operation on the specified type of data is identified and caused to perform the requested operation. A mechanism is provided for linking data from one object into another object. A catalog includes both information about objects and about links between objects. Data interchange services are provided for communicating data between objects of different types, using a set of standard data interchange formats. A facility is provided to permit two processes that are to cooperate in a data interchange operation to identify each other and to identify data formats they have in common. A facility is provided for managing shared data in units of data known as "resources". Customized versions of resources can be created and co-exist with standard versions of the resources. A resource retrieval function determines whether a customized or a standard resource is to be returned in response to each request for a resource.

**5 Claims, 9 Drawing Sheets**